IN THE SENATE OF THE UNITED STATES.

MAY 6, 1896.—Referred to the Committee on Commerce and ordered to be printed.

The VICE-PRESIDENT presented the following

LETTER FROM THE ASSISTANT SECRETARY OF WAR, TRANSMITTING A LETTER FROM THE CHIEF OF ENGINEERS, TOGETHER WITH A COPY OF A REPORT FROM MAJ. J. H. WILLARD, CORPS OF ENGINEERS, OF A PRELIMINARY EXAMINATION MADE BY HIM IN COMPLIANCE WITH THE PROVISIONS OF THE RIVER AND HARBOR ACT OF AUGUST 17, 1894, OF BIG SUNFLOWER RIVER, MISSISSIPPI.

WAR DEPARTMENT,
Washington, D. C., May 5, 1896.

SIR: I have the honor to inclose herewith a letter from the Chief of Engineers, dated May 4, 1896, together with a copy of report from Maj. J. H. Willard, Corps of Engineers, dated April 4, 1896, of a preliminary examination made by him in compliance with the provisions of the river and harbor act of August 17, 1894, of Big Sunflower River, Mississippi.

Very respectfully,

JOSEPH B. DOE,
Assistant Secretary of War.

The PRESIDENT OF THE UNITED STATES SENATE.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., May 4, 1896.

SIR: I have the honor to submit the accompanying copy of report, dated the 4th ultimo, by Maj. J. H. Willard, Corps of Engineers, respecting a preliminary examination of Big Sunflower River, Mississippi, with a view to its improvement as high as Clarksdale by locks and dams, made to comply with the provisions of the river and harbor act of August 17, 1894.

For reasons stated Major Willard is of the opinion that the Big Sunflower River is worthy of improvement to a greater extent than has yet been authorized, and that the cost of a survey required for the preparation of a project for increasing the scope of improvement as an open river would be $10,000, but that this river alone is not worthy of improvement by the United States by locks and dams at the present time; although if considered as a part of a system of internal navigation, to be formed by locks and dams, it might be worthy of improvement in the same way, the extension depending upon the development of its valley, and eventually, probably, as high as Clarksdale.

He is also of the opinion that an exhaustive survey, at a cost of not less than $50,000, of the streams of the Yazoo Basin should be undertaken, for the purpose of ascertaining the feasibility and cost of a system of locks and dams in said basin, and that such survey is a public necessity.

Col. J. W. Barlow, Corps of Engineers, Division Engineer, concurs in the views of Major Willard respecting a comprehensive survey of the Yazoo System.

In my opinion, which the law requires me to express, the improvement of the Big Sunflower River as high as Clarksdale by locks and dams should not be undertaken by the United States at this time.

Very respectfully, your obedient servant,

W. P. CRAIGHILL,
Brig. Gen., Chief of Engineers.

Hon. DANIEL S. LAMONT,
Secretary of War.

PRELIMINARY EXAMINATION OF BIG SUNFLOWER RIVER, MISSISSIPPI, WITH A VIEW TO ITS IMPROVEMENT AS HIGH AS CLARKSDALE BY LOCKS AND DAMS.

UNITED STATES ENGINEER OFFICE,
Vicksburg, Miss., April 4, 1896.

GENERAL: In compliance with instructions contained in letter from your office, dated August 20, 1894, I have the honor to submit this report upon "Big Sunflower River, Mississippi, with a view to its improvement as high as Clarksdale by locks and dams," the preliminary examination of which was called for by section 10 of river and harbor act of August 17, 1894.

Big Sunflower River was examined under Major Benyaurd late in 1878, in accordance with a provision in the act of June 18, 1878. Owing to the outbreak of yellow fever in this valley, and to other circumstances, the examination was hasty and incomplete. No reports, maps, or sketches are on file in this office, and it is inferred that none were made, owing to the disturbed condition of this part of the country.

The general character of the alluvial streams in this district indicated the same general plan for preliminary improvement, viz, clearing the banks of leaning timber, removing snags, logs, and other obstructions from the channel, etc.; and the knowledge of the existence of certain shoals suggested closing chutes and building inexpensive wing dams. Major Benyaurd's project contemplated work during three or four successive low-water seasons at an estimated expenditure of $66,000. Congress has appropriated $67,000, from March 3, 1879, to August 17, 1894, but this amount, spread over seventeen years, has not accomplished what was hoped for when the estimate was submitted, nor given complete satisfaction to those interested in navigation, although the improvement has been considerable in giving a longer period of navigation each season and materially lessening its dangers. Major Benyaurd's opinion was that radical improvement of Big Sunflower River should be postponed, and attention paid chiefly to the immediate needs of commerce, an opinion fully justified by reference to the conditions existing at that time. Then there was no levee system. Existing levees were independent, low grade, and broken, and the whole Yazoo Delta was overflowed by every great high water from above Clarksdale to Vicksburg, with the exception of a narrow strip between Clarks-

dale and Tallahatchie River to a point a few miles below Greenwood on Yazoo River. The alluvial map of Mississippi Valley, published by the Mississippi River Commission, illustrates this in a striking way.

Now this great basin is entirely free from overflow in its upper part, and subject only to backwater up Yazoo River, depending upon the elevation of flood water at the limit of the Yazoo Front at Brunswick, a few miles above Vicksburg.

When the call for this examination came there was practically no definite information on file in this office except that which had been obtained incidentally while prosecuting other work.

In 1858 a line of levels had been run under the Delta survey from Greenwood on Yazoo to Prentiss on Mississippi River, but no permanent benches were made, so that the section gives only a notion of relative elevations. In 1879 a section was made under the Mississippi River Commission from Lake Providence to Yazoo City, which has been tied in by connecting the benches at each end with the system of precise levels of the Coast Survey and Engineer Department.

In developing the survey for the project for diverting Yazoo River and improving Vicksburg Harbor a loop of precise levels had been finished from Vicksburg to Yazoo City and from Greenville to Greenwood, and thence to Yazoo City, the line of the United States Coast Survey closing between Vicksburg and Greenville, by which we were able to get elevations on Sunflower River at Baird, Georgia Pacific Railroad Bridge, and at L'Argent, the junction of Big Sunflower with Yazoo. In order to get elevations at Clarksdale a line of precise levels was run from Mississippi River Commission benches at Friar Point to Yazoo and Mississippi Valley Railway Bridge across Big Sunflower near Clarksdale. Maps were then compiled from such county maps as could be found, supplemented by a tracing of land-survey maps at the State capitol, Jackson, Miss. With this foundation Assistant Engineer Marshall made the field reconnoissance in February, 1896, using an improvised plane table in the pilot house of one of the small snag boats, a method that had been tried with considerable success on Ouachita River. The maps* have been adjusted on eleven sheets, scale 1:10,000, by comparison with those of the land surveys, and give a very fair representation of the general course and windings of the river. With them is a combined hydrograph* of Big Sunflower and Yazoo rivers from definite information obtained by levels to Clarksdale, Baird, and L'Argent for Big Sunflower, and at a greater number of points on Yazoo.

This hydrograph is interesting as showing the protection due to the levees on Yazoo Front, but its value is quite limited for discussing improvement of Big Sunflower River by means of locks and dams. It has a value of its own, however, in this that it indicates the probability that each stream of what I may call the Yazoo System should carry its own water hereafter and be free from dangerous floods so long as the levees on Yazoo Front shall stand.

As already suggested, conditions have changed immensely since the first examination of Big Sunflower River in 1878, and it would be difficult to find another portion of country of like area where improvement and development have been so marked. By the cooperation of the river commission, State levee commissions, and the Yazoo and Mississippi Valley Railway Company a basin some 200 miles long by about 60 miles broad at its widest part has been secured against overflow. The lands so reclaimed are the most fertile in the Mississippi Valley, and

*Not submitted.

capable of sustaining a large population. The country is being settled rapidly, especially by small farmers, colored as well as white, and by not a few colonists from Northern States.

The Illinois Central bounds this basin on east and west, and branches are being extended into the interior from both divisions where the Georgia Pacific division of the Southern Railway crosses it from Greenville on Mississippi River to Greenwood on the Yazoo. But the people want the natural routes improved, and transportation assured the year round, especially those who live in the secondary valleys or river bottoms, who find the long hauls from their farms to railway stations a heavy burden even when the country roads are in fair condition, and who feel that an assured river trade would benefit all by equalizing and moderating freight charges.

The hydrograph shows what the general gain has been, but figures give concrete ideas, and accordingly the following table has been made showing the "protection," that is, the difference between overflow high water from Mississippi River and natural high water on Big Sunflower and Yazoo rivers since the levee system has been inaugurated. Elevations in this engineering district are in the metric system, and refer to an arbitrary plane known as Cairo datum.

	Meters.	Feet.
Big Sunflower:		
Clarksdale	11.3	= 36.2
Baird	7.6	= 24.9
Yazoo River:		
Greenwood	3.50	= 11.5
Yazoo City	3.47	= 11.4

The gain in Big Sunflower Valley obviously should be greater than in Yazoo Valley, for Yazoo River skirts the hills bounding this great basin on the east and receives the rains quickly on the one hand, while on the other it was subject to Mississippi floods, either from above through Tallahatchie River or across the basin, only after all the intermediate valleys had been filled. Of course the immense range at Clarksdale was due to the flow through the historic Hushpucana.

The hydrograph also indicates that natural high water should be within banks, as a rule, and, therefore, that a system of slack-water navigation should not be dangerous to the inhabitants of the valley, especially if movable dams were employed, to be lowered on the approach of a flood wave, and to be thrown down at stages high enough for open navigation.

The revival of interest in the American bear-trap and its recent improvements gives grounds for believing that this form of dam should be peculiarly fitted for streams of small low-water discharge, and especially for Big Sunflower River, which differs from all other streams in this basin in that it is comparatively free from drift and is a clear-water stream, being fed chiefly by springs and filtration. The question of foundations should not be regarded as a serious one in the light of modern experience. There is a lock of cut stone at Kampsville, on Illinois River, 375 feet long by 75 feet wide by 7 feet lift, with a fixed dam 1,200 feet long on an alluvial foundation inclosed and confined by sheet piling, and therefore I have no doubt that smaller constructions may be built with safety on Big Sunflower River, although the cost would be somewhat large.

There are other considerations, however, that would demand close attention and which indicate the need of an exhaustive survey of the whole valley. The streams in this basin interlace and connect through creeks, bayous, and lakes, and unless due care were taken in locating a

dam or in closing outlets the effect of a pool might be to flank and abandon a lock and dam and make a new channel into one of the side streams. Big Sunflower River connects with Yazoo through Lake George, Silver Creek on the eastward, and with Rolling Fork, Little Sunflower, and Deer Creek, and so around again to Yazoo below. The drainage and discharge of Big Sunflower with respect to Yazoo River is such that at times, when the latter is rising, there is a strong current of backwater felt for miles up Big Sunflower, so that the first lock would require guard gates if placed in Big Sunflower River, or else the lock and dam would have to be placed in Yazoo River below L'Argent. The latter plan would have the merit of giving slack water in each stream in the inverse ratio of their slopes, while obviating the danger of flanking from the first pool into Yazoo through connections from the left or eastward bank of Big Sunflower.

The main question, then, may be answered in the affirmative; it is feasible to improve Big Sunflower River as high as Clarksdale by locks and dams.

The number of dams would depend upon the lifts that could be given with safety and upon the relative elevations of the pools formed by them with respect to the banks and to the connections with other streams in the basin. Assuming that the interests of navigation would not be satisfied with less than 1 meter, say 3 feet, above low water at Clarksdale, the levels indicate at least nine dams, with an average lift of about 2½ meters (about 8 feet), and that the first dam, as already suggested, would have to be put in Yazoo River below the mouth of Big Sunflower.

The cost of such a system would be large, and the annual charges for maintenance and operation probably would exceed the amount that has been spent for improving Big Sunflower since Congress first authorized the work.

From the commercial statistics it appears that the business on Big Sunflower River during the fiscal year 1895 amounted to about 24,000 tons, valued at about $950,000. How great the increase would be from the inauguration of slack-water navigation and from the progressive settling and development of the country would be mere guesswork, but it is probable that some years would elapse before the benefits would become commensurate with the outlay.

With these views, and from the information at hand, I am constrained to the opinion that Big Sunflower River alone is not worthy of improvement by locks and dams at the present time, and that such work is not a public necessity.

The last paragraph of the letter of instructions reads as follows:

> In the event of your reporting that the harbor or river is worthy of improvement by the General Government, you will please submit an estimate of the amount that will enable you to make a survey and report, including a project, with estimate of the cost of the improvement proposed.

In my annual reports for several years I have submitted large estimates for completing the improvement of Big Sunflower River under the approved project, both to accomplish more work in proportion to appropriations and to give more immediate and lasting benefits.

I consider Big Sunflower River worthy of improvement by the United States to a greater degree than has been authorized, and if the stream should be regarded, as it ought to be, part of a system of internal navigation composed of Coldwater, Tallahatchie, Yalobusha, Yazoo, Tchula Lake, and Big Sunflower rivers I should feel no hesitation in recommending a thorough survey, not only of the last with a view to

its improvement by locks and dams, but of the whole basin in connection with a like improvement of the main stem—the Yazoo—and the tributaries above. On this basis it might be possible to develop an internal navigation of over 600 miles in the Yazoo Basin at a very much less cost per mile than for Big Sunflower River alone.

Assistant Engineer Marshall's moderate estimate of $18,000 for a creditable survey of Big Sunflower River is concurred in by me, because the foundation of the system of levels has been laid. For the same reason a thorough survey of the streams of the Yazoo System could be made for a comparatively small amount, say $50,000, covering three seasons' work. Such a survey would pay for itself either in preventing an undertaking far beyond the demands of commerce or in enabling the constructing engineer to reduce the number of locks and dams very materially. The omission of one lock and dam would cover the charges for such a survey and of all local surveys and examinations if improvement by locks and dams should be approved by Congress.

I invite attention to report of Assistant Engineer Marshall and to the commercial statistics, which have been compiled from the best information obtainable. The report for the fiscal year 1895 gave the total freights of the Yazoo system as 220,591 tons and the estimated value $4,806,000.

Big Sunflower River alone is worthy of improvement by the United States to a much greater extent than first proposed, and the work is a public necessity. A survey of considerable magnitude would be required for a project for increasing the scope of improvement as an open river, and would cost $10,000.

Big Sunflower River alone is not worthy of improvement by locks and dams, and therefore no survey should be required.

Big Sunflower River, as part of a system of internal navigation to be formed by locks and dams, might be worthy of improvement in the same way, the extension depending upon the development of its valley, and eventually, probably, as high as Clarksdale.

The subject is worthy of serious study, and I am of the opinion that an exhaustive survey at a cost of not less than $50,000 should be undertaken of the streams of the Yazoo Basin in the same manner as now in progress under authority of Congress for Ouachita River and its principal tributaries, for the purpose of ascertaining the feasibility and cost of a system of locks and dams in that basin, and that such a survey is a public necessity.

Very respectfully, your obedient servant,

J. H. WILLARD,
Major, Corps of Engineers.

Brig. Gen. W. P. CRAIGHILL,
Chief of Engineers, U. S. A.

(Through Col. John W. Barlow, Corps of Engineers, Division Engineer, Southwest Division.)

[First indorsement.]

UNITED STATES ENGINEER OFFICE,
SOUTHWEST DIVISION,
Washington, D. C., April 28, 1896.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in the views of Major Willard respecting a comprehensive survey of the Yazoo System.

J. W. BARLOW.

REPORT OF MR. H. M. MARSHALL, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Vicksburg, Miss., March 12, 1896.

MAJOR: I have the honor to report on the examination of Big Sunflower River, Mississippi.

The river was examined in 1878 under direction of Major Benyaurd, and the following extract from report of Chief of Engineers for 1879 contains the gist of the report made by that officer:

"BIG SUNFLOWER RIVER.

"This river has its source at Mud Lake, in Coahoma County, Miss., near what is known as Horseshoe Bend on the Mississippi River. As a tributary of the Yazoo, it joins that stream about 55 miles above its mouth, flowing through the counties of Coahoma, Washington, and Issaquena, and forming part of the boundary between the latter and Yazoo County. During the high-water stages it is navigable for a distance of 280 miles, or as high up as the town of Clarksdale, in Coahoma County, which is known as the head of navigation. During the season of low water, however, the boats seldom ascend higher than Garvins Ferry, Coahoma County, a distance of 135 miles. It is not every year that they can reach this point. Some years the steamboat travel is entirely suspended for a short time; generally, however, we can depend upon uninterrupted low-water navigation for a period of ten months.

"The stream has a uniform low-water width of from 150 to 175 feet. The obstructions to navigation at low-water season consist of snags and sunken logs, and at all stages the leaning timber along the banks are serious obstructions. These obstructions could be readily removed and a channel way maintained of sufficient width and depth for the passage of such steamboats as are employed in carrying the commerce of the river. In many places the low-water channel, being filled with logs, is of no greater depth than 18 inches, while the confining snags on either side greatly reduce the width, leaving barely sufficient room for the safe passage of the small steamers that navigate the river. These obstructions are so general throughout the entire length of the stream, and are so constantly being brought in by the sliding banks, etc., that it would be useless to attempt any description of the points at which they are to be found. If any improvement looking to their removal should be attempted, the work should commence at the upper limit and work gradually down, taking out all obstructions that are met with.

"While these, as stated, abound throughout the entire river, there are two points especially mentioned between which they are found in great number and are a serious obstruction, viz, between the mouth of Silver Creek and Choctaw Bend (foot of Muscle Shoals). These two points are respectively 25 and 43 miles from the mouth of the Big Sunflower, thus covering a distance of 18 miles.

"While these obstructions are what might be termed accidental or temporary obstructions, there are two which are of a permanent character, viz, Oliphants Bar and Muscle Shoals.

"Oliphants Bar begins at the mouth of the river and extends a distance of 15 miles, though on the upper 3 miles is where the shoalest water is found, the depth throughout this section being about 18 inches, while the average on the portion below it is about 24 inches.

"Muscle Shoals are about 5 miles in length, the least depth of water over them being 17 inches, while the general average depth is 24 inches.

"The method of improvement suggested for these shoals is to build ordinary wing dams, and thus scour out a channel sufficiently deep for the passage of the small boats that navigate the river, from 3 feet to 40 inches being ample for the purpose."

Appropriations have been made by acts of Congress from time to time, and work has been prosecuted for the improvement of the river, a summary of which appears in Report of Chief of Engineers, U. S. A., 1894, pp. 1513, 1514.

The examination made by me on board U. S. S. *Thomas B. Florence*, February 24 to 29, extended from the mouth of the river to the Georgia Pacific Railroad crossing (Southern Railway) at Baird, in Sunflower County, a distance of 88 miles. By means of a drawing board mounted on a revolving pivot, and with the aid of a prismatic compass to get direction, and by time and speed of boat for distances, a sketch was made consisting of 9 sheets to scale about 1:10,000. This gives a fair idea of the relative widths of the river and the character of the country through which it flows.

Precise levels run in connection with improvement of Yazoo River in 1893, and those run in 1894 from Friars Point to Clarksdale, "as a base for checking levels to be run in surveying Big Sunflower River, with a view to its improvement as high as Clarksdale by locks and dams," afford the only information at hand concerning elevation of water surface and slope. In connection with the first levels, gauges were read through the high and low water of 1893 at Baird, and at the mouth. * * *

From maps of United States Engineer Department survey of part of Yazoo River, and from county and township plats, 6 sheets have been compiled, on scale 1:50,000, showing the entire length of Big Sunflower, and also the Yazoo below Yazoo City.

From these sources it is learned that conditions have changed since the report of 1879.

In the first place, the distances then were overestimated—usually by one-third. From the mouth to Clarksdale is 180 instead of 280 miles. The channel width is not uniform, but ranges between 150 and 450 feet at ordinary boating stage between the mouth and the railroad bridge at Baird. Only in a few places does the timber on the banks constitute even an inconvenience to navigation, and now the banks are remarkably stable. Without doubt the latter change is due to the exclusion of the flood waters of the Mississippi by means of the levees. The measure of protection is illustrated on the sheet showing high and low water limits herewith.

Briefly, Big Sunflower runs nearly south along the median line through what is termed the Yazoo Delta. Its banks are generally high, being above overflow, and as stated, quite stable. Its bed is wide, and in that part known as the "Lake," about 23 miles in extent, it is deep. The slope and discharge are small, the latter at high water and at low water bearing the ratio 5 to 1. In addition to Oliphants and Muscle shoals, mentioned in the early report, there are nine short shoals below Baird. These are Callao, Hedrick, and Osceola, all affording a depth of 26 inches at low water and within a mile of each other; beginning 55 miles from the mouth, Hollywood, with 16 inches at the sixty-ninth mile; Shellridge, Woodburn, and Anderson, with 14, 24, and 16 inches at the seventy-sixth, seventy-seventh, and seventy-eighth mile; Sharp, with 28 inches at eighty-third mile, and Jenkins, with 16 inches at the eighty-sixth mile. That is, beginning at the mouth, in the first 33 miles the river is obstructed by shoals, the slope is concentrated, the banks wooded, and there are numerous outlets; in the next 23 miles the river is practically a wide deep lake, and above the lake there is a succession of pools and shallow places. The country tributary to the river is under cultivation to a considerable degree, and the further development is rapidly going on. This strip of territory, 104 miles long by 10 miles wide, is easily capable of yielding annually products to the value of $10,000,000.

Whether the river is susceptible of improvement by locks and dams at a cost commensurate with the benefit to commerce, present or prospective, will depend upon the quantity of water it discharges, the length of its pools, the distribution of its slope over the shoals, and the number and extent of low places along its banks to be artificially raised. These matters can only be ascertained by an accurate survey. This could be done in a fairly creditable manner for $18,000.

Assistant Engineer Ewens has collected all commercial statistics obtainable, and has embodied them in a report which is submitted herewith.

Very respectfully, your obedient servant,

H. M. MARSHALL, *Assistant Engineer.*

Maj. J. H. WILLARD,
Corps of Engineers, U. S. A.

REPORT OF MR. JOHN EWENS, ASSISTANT ENGINEER, ON COMMERCIAL STATISTICS OF BIG SUNFLOWER RIVER.

UNITED STATES ENGINEER OFFICE,
Vicksburg, Miss., March 9, 1896.

MAJOR: In accordance with your orders, I have the honor to submit the following report on the commercial resources, present and prospective, of the Big Sunflower River, also the commercial statistics for the fiscal years 1888 to 1895, and for the past calendar year:

The usual difficulty in obtaining reliable reports from steamboats was encountered. The various owners, changes of port and clerks, and the clerical methods in vogue on the river, render the information obtained from this source at times unreliable and misleading. To obtain a portion of the information below, the following plan was followed: The usual information furnished by the steamboats was first obtained. A canvass was then made of all the plantation commission houses, grocers, hardware, etc., in order to obtain as close an estimate of the upstream freights as possible. A quite reliable estimate of the lumber and stave traffic was secured from the parties interested. In connection with this data the acreage of all lands contiguous to the Sunflower that was cultivated in the calendar year 1895 was obtained.

During the calendar year of 1895 the Big Sunflower River was reported navigable as follows:

January 1 to April 30, to Faisonia.
May 1 to June 1, to Woodburn.
June and July, to Campbellsville.

October 1 to December 31, to Baird.

The following stern-wheel steamers were reported as having navigated Big Sunflower River in the calendar year 1895 from Vicksburg and Yazoo City:

Name.	Tonnage.	Length.	Breadth.	Depth.	Draft.	
					Light.	Loaded.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Ft. in.*	*Ft. in.*
Maggie	50.73	85	19	3.5	1 5	3 6
Yazonia	62.84	95	19.8	3.5	1 6	3 6
Fifteen	75	103	18	3.5	1 8	3 0
Novelty	49.45	76.4	16.4	3	1 3	3 6
Atlanta	85.03	93	16.4	3.7	1 10	3 0
Mima	62.72	66	17	3.2	1 2	2 6
Crown Point	159.14	123	25	4.2	1 8	5 0
Birdie Bailey	109.74	111	22	3.5	1 10	4 0

The information obtainable regarding the number of trips made and the destination was so unreliable that it has been omitted. During extreme low water, when the bar at the mouth of the Yazoo River interferes, the river source of supplies is Yazoo City, Miss.

The following is the commerce reported for the fiscal years 1888–89 to 1894–95:

Articles.	1894–95.	1893–94.	1892–93.	1891–92.	1890–91.	1889–90.	1888–89.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Cotton	3,601	2,400	2,699	4,118	2,375	2,594	4,000
Cotton seed	5,760	5,700	5,250	5,450	3,500	3,975	6,000
Hides	24	12	19	12	.....	.....	1
Live stock	71	38	250	265	70	150	150
Saw logs	2,475	5,650	19,000	21,835	15,400	4,000	.....
Lumber	1,500	780	1,130	906	920	869	.....
Staves	8,105	9,405	9,840	4,430	3,219	5,250	490
Miscellaneous	375	2,050	1,088	2,549	2,027	.....	3,880
Total down freight	21,911	26,035	39,276	39,565	27,511	16,838	14,521
Return freight	2,623	4,285	4,023	7,489	4,473	5,322	9,680
Total	24,534	30,320	43,299	47,054	31,984	22,160	24,201
Estimated value	$956,000	$988,000	$893,000	$1,354,000	$945,000	$1,240,000	$1,858,000

The river commerce for the calendar year 1895, as far as can be ascertained from the sources of information referred to above, was as follows:

	Tons.
Cotton	3,560
Cotton seed	5,140
Hides	11
Live stock	60
Saw logs	1,500
Lumber	950
Staves	4,500
Miscellaneous	25
Total down	15,746
Return	1,700
Total	17,446
Estimated value	$796,400

I consider the above the most conservative estimate ever obtained for the Big Sunflower River. The marked shrinkage in the timber interests, saw logs, and staves was largely due to the continuous low-water stage of the river during the past two seasons. The amount of saw logs and staves cut and awaiting sufficient water to bring them out is estimated to be: Saw logs, 4,000,000 feet; staves, 500,000 pieces. As near as can be ascertained the Yazoo and Mississippi Valley and Georgia Pacific railways transported not less than four-fifths of the cotton and cotton seed produced in the Big Sunflower River Valley in the calendar year 1895. Although the former

railway parallels the (right bank) Big Sunflower at distances of from 5 to 20 miles through the entire developed section of the river, the haul overland from the river to the railroad is expensive and at times hazardous, owing to the numerous little streams that have to be crossed and the undeveloped roads that have to be traversed. The acreage of cultivable lands directly tributary to the Big Sunflower is estimated to be about 600,000 acres; 25 per cent of these lands are already cleared and under cultivation. The majority of the planters are colored, who plant on a very limited scale. The remaining lands are covered with a fine growth of marketable timber and excellent grazing ranges of cane. Cypress, oak, ash, and gum are among the principal varieties of timber that seem to be almost inexhaustible. The lands of the Big Sunflower are regarded among the most fertile of the Delta, and produce readily hay, oats, and corn of a fine quality equally well as they produce cotton.

With uninterrupted navigation that would insure reasonable transportation facilities for the crops and supplies, it is probable that the lands already under cultivation would yield their maximum, while the forest of fine timber would find a paying market that would more than pay for preparing the lands thus cleared for cultivation.

Very respectfully, your obedient servant,

JOHN EWENS, *Assistant Engineer.*

Maj. J. H. WILLARD,
Corps of Engineers, U. S. A.